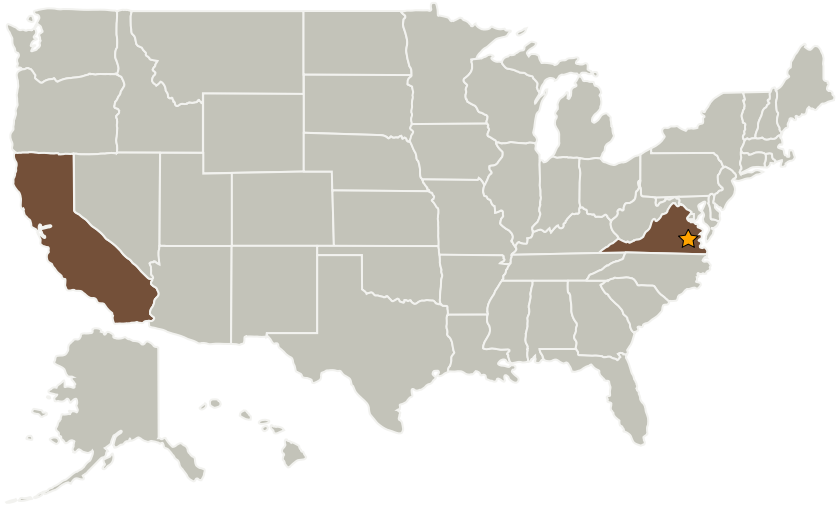
A High Energy and High Efficiency Spectral Shaping Single Frequency Fiber Laser, Phase II

Completed Technology Project (2007 - 2009)

Project Introduction

This SBIR phase II project proposes a single frequency high energy fiber laser system for coherent Lidar systems for remote sensing. Current state-of-art technologies can not provide all features of high energy and efficiency, compactness, narrow linewidth, super frequency and power stability, low noise, and high extinction ratio at the same time. PolarOnyx proposes, for the first time, a high energy (1 mJ) single frequency (< 1 KHz) fiber laser transmitter to meet with the requirement of solicitation. It is a specialty fiber based MOPA operating at 1550 nm. PolarOnyx proposes a revolutionary approach to fundamentally resolve the issues of nonlinear effects by employing our patent pending proprietary technologies in fiber lasers. Our unique spectral shaping techniques enable us to reduce the SBS and ASE noise significantly in the amplifier for commercially available EYDFs and to reuse the residual pump to further increase the efficiency. These will make the fiber laser transmitter system superior in terms of wall plug efficiency (over 30%), energy(1 mJ), noise, size, and cost. In Phase I, we have demonstrated all major functions of the proposed idea and shown a practical energy scaling capability in proof of the concept. A prototype of 1 mJ level fiber laser will be delivered at the end of Phase II.

Primary U.S. Work Locations and Key Partners



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Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Langley Research Center (LaRC)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

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Organizations Performing Work	Role	Type	Location
★Langley Research Center(LaRC)	Lead Organization	NASA Center	Hampton, Virginia
Polaronyx, Inc.	Supporting Organization	Industry Small Disadvantaged Business (SDB)	San Jose, California

Primary U.S. Work Locations	
California	Virginia

Project Transitions

November 2007: Project Start

November 2009: Closed out

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Technology Areas

Primary:

- TX08 Sensors and Instruments
  - TX08.1 Remote Sensing Instruments/Sensors
    - TX08.1.5 Lasers